

Typical Performance

- Ultra wide range input (2:1), output 6W
- Conversion efficiency 84% (Typ.)
- Isolated voltage 1500Vdc
- Ultra-low standby power
- Ultra-fast startup: 100mS (Typ.)
- Operating temperature range: -40~+85°C
- Output short circuit, overcurrent, overvoltage protection
- Metal shell, low output ripple
- International standard pins, PCB board in-line installation

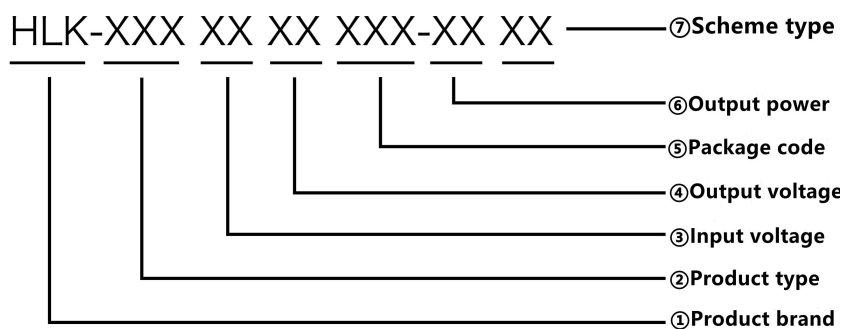
6W, ultra-wide voltage input,
isolated voltage regulator single/dual,
DIP package, DC-DC power module



RoHS

The output power of VR(A)B_YMD-6WR3 series products is 6W, 2:1 wide voltage input range, efficiency up to 84%, 1500VDC conventional isolation voltage, allowable operating temperature -40°C to +85°C, with output overvoltage, overcurrent, short circuit protection function, widely used in medical, industrial control, electric power, instrumentation, communication, railway and other fields.

Product Coding Rules



Product List

Certification	Product module number ^①	Input voltage range (Vdc)		Output voltage/current		Ripple and noise	Maximum capacitive load	Efficiency @ full load
		Nominal value (range value)	Max value	Output voltage (Vdc)	Output current (mA) (Max.Min.)	Full load (mVp-p) Typ/Max.	μF	(%) Min/Typ.
	VRB1203YMD-6WR3	12 (9~18)	30	3.3	1800/0	30/50	2500	75/77
	VRB1205YMD-6WR3			5	1200/0	30/50	2200	76/78
	VRB1212YMD-6WR3			12	500/0	50/80	680	78/80
	VRB1215YMD-6WR3			15	400/0	50/80	470	79/81
	VRB1224YMD-6WR3			24	250/0	50/80	220	81/83
	VRB1231YMD-6WR3			31	194/0	80/100	100	81/83
	VRB1236YMD-6WR3			36	166/0	80/100	100	81/83
	VRA1205YMD-6WR3			±5	±600/0	30/50	1100	76/78

VRA1212YMD-6WR3			±12	±250/0	50/80	330	78/80
VRA1215YMD-6WR3			±15	±200/0	50/80	220	79/81
VRA1224YMD-6WR3			±24	±125/0	50/80	100	81/83
VRB2403YMD-6WR3	24 (18~36)	40	3.3	1800/0	30/50	2500	75/77
VRB2405YMD-6WR3			5	1200/0	30/50	2200	76/78
VRB2412YMD-6WR3			12	500/0	50/80	680	80/82
VRB2415YMD-6WR3			15	400/0	50/80	470	80/82
VRB2424YMD-6WR3			24	250/0	50/80	220	82/84
VRA2405YMD-6WR3			±5	±600/0	30/50	1100	76/78
VRA2412YMD-6WR3			±12	±250/0	50/80	330	80/82
VRA2415YMD-6WR3			±15	±200/0	50/80	220	80/82
VRA2424YMD-6WR3			±24	±125/0	50/80	100	82/84
VRB4803YMD-6WR3	48 (36~72)	80	3.3	1800/0	30/50	2500	75/77
VRB4805YMD-6WR3			5	1200/0	30/50	2200	76/78
VRB4812YMD-6WR3			12	500/0	50/80	680	80/82
VRB4815YMD-6WR3			15	400/0	50/80	470	80/82
VRB4824YMD-6WR3			24	250/0	50/80	220	82/84
VRA4805YMD-6WR3			±5	±600/0	30/50	1100	76/78
VRA4812YMD-6WR3			±12	±250/0	50/80	330	80/82
VRA4815YMD-6WR3			±15	±200/0	50/80	220	80/82
VRA4824YMD-6WR3			±24	±125/0	50/80	100	82/84
VRB1D03YMD-6WR3	110 (72~144)	180	3.3	1800/0	30/50	2500	75/77
VRB1D05YMD-6WR3			5	1200/0	30/50	2200	76/78
VRB1D12YMD-6WR3			12	500/0	50/80	680	80/82
VRB1D15YMD-6WR3			15	400/0	50/80	470	80/82
VRB1D24YMD-6WR3			24	250/0	50/80	220	82/84
VRA1D05YMD-6WR3			±5	±600/0	30/50	1100	76/78
VRA1D12YMD-6WR3			±12	±250/0	50/80	330	80/82
VRA1D15YMD-6WR3			±15	±200/0	50/80	220	80/82
VRA1D24YMD-6WR3			±24	±125/0	50/80	100	82/84

Note:

1. Due to the limited space, the above is just a list of typical products. If you need products other than the list, please contact the sales department of our company.
2. The maximum capacitive load indicates the maximum capacitive load that can be connected to +Vo or -Vo. If it exceeds this value, the product will not be able to start normally.
3. If the input voltage exceeds the maximum value, it may cause permanent damage to the product.

Test conditions: Unless otherwise specified, all parameter tests are measured under nominal input voltage, purely resistive rated load and 25°C room temperature.

Input Features						
Items	Working conditions		Min.	Typ.	Max.	Unit
Input current (full load/ no load)	12VDC nominal input series, nominal input voltage	3.3V	-	428/25	440/30	mA
		Other	-	641/25	658/30	
	24VDC nominal input series, nominal input voltage	3.3V	-	214/13	220/15	
		Other	-	320/13	329/15	
	48VDC nominal input series, nominal input voltage	3.3V	-	107/7	110/8	
		Other	-	161	164/8	
	110VDC nominal input series, nominal input voltage	3.3V	-	47/3	48/4	
		Other	-	70/3	72/4	
Reflected ripple	12VDC nominal input series, nominal input voltage		-	-	-	mA
	24VDC nominal input series, nominal input voltage		-	-	-	
	48VDC nominal input series, nominal input voltage		-	-	-	
	110VDC nominal input series, nominal input voltage		-	20	-	
Impulse voltage (Isec.max)	12VDC nominal input series, nominal input voltage		-0.7	-	30	
	24VDC nominal input series, nominal input voltage		-0.7	-	50	
	48VDC nominal input series, nominal input voltage		-0.7	-	100	
	110VDC nominal input series, nominal input voltage		-0.7	-	200	
Starting voltage	12VDC nominal input series, nominal input voltage		-	-	9	VDC
	24VDC nominal input series, nominal input voltage		-	-	18	
	48VDC nominal input series, nominal input voltage		-	-	36	
	110VDC nominal input series, nominal input voltage		-	-	72	
Input undervoltage protection	12VDC nominal input series, nominal input voltage		-	-	-	
	24VDC nominal input series, nominal input voltage		-	-	-	
	48VDC nominal input series, nominal input voltage		-	-	-	
	110VDC nominal input series, nominal input voltage		-	-	-	
Start time	Nominal input voltage and constant resistance load		-	100	-	mS
Input filter type			PI type			
Hot plug			No support			

Output Features

Items	Working and test conditions	+Vo1			-Vo2		
		Min.	Typ.	Max.	Min.	Typ.	Max.
Output load	Load percentage	0%	-	100%	0%	-	100%
Output voltage accuracy		-	±1.0%	±2.0%	-	±2.0%	±3.0%
Linear adjustment rate	Input voltage range	-	±0.2%	±0.5%	-	±1.5%	±2%
Load regulation	20%~100% rated load, balanced load	-	±0.5%	±1%	-	±4.0%	±5.0%
Ripple & Noise	Pure resistive load, 20MHz bandwidth, peak-to-peak	-	50mVp-p	80mVp-p	-	50mVp-p	80mVp-p
Startup delay time		-	100ms	-	-	100ms	-
Output voltage regulation	Input voltage range	-	No adjustment	-	-	No adjustment	-
Dynamic response step deviation	25% nominal load step	-	±3.0%	±5.0%	-	±3.0%	±5.0%
Dynamic response recovery time		-	300μs	500μs	-	300μs	500μs
Output overvoltage protection	Full voltage range input	110%Vo	-	160%Vo			
Output overcurrent protection	Full voltage range input	110%Io	150%Io	200%Io			
Output short circuit	Full voltage range input	sustainable, self-healing					

Note:

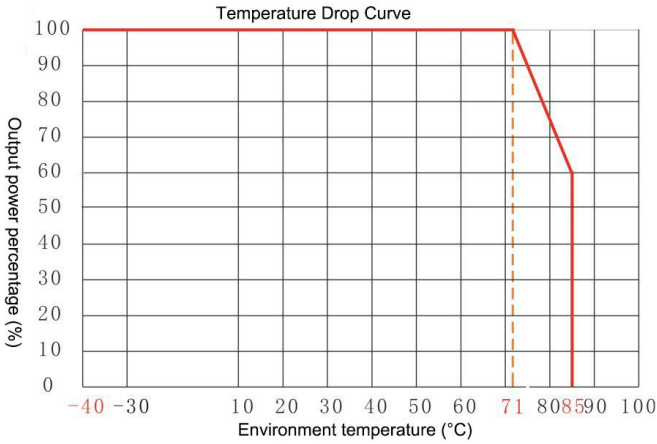
- ①For product models with output voltages of ±5VDC and ±9VDC, under 0%-5% load conditions, the maximum output voltage accuracy is ±5%;
- ②When tested under the working conditions of 0%-100% load, the index of the load adjustment rate is ±5%;
- ③0%-5% load ripple & noise less than or equal to 5% Vo. Ripple and noise test method Twisted pair test method, which can add capacitive load at the output to reduce light load ripple.

General Characteristics

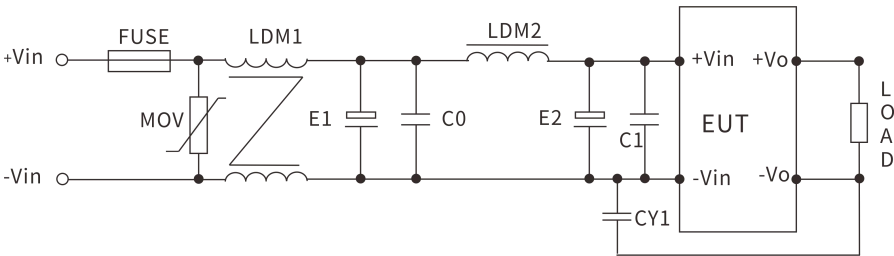
Items	Working conditions	Min.	Typ.	Max.	Unit
Insulation voltage	Input-output, test time is 1 minute, leakage current is less than 1mA	1500	-	-	VDC
Insulation resistance	Input-output, insulation voltage 500VDC	1000	-	-	MΩ
Isolation capacitor	Input-Output, 100KHz/0.1V	-	1000	-	pF
Operating temperature	Refer to the temperature derating curve	-40	-	+85	°C
Storage temperature		-40	-	+125	
Operating maximum case temperature		-	-	+100	
Storage humidity	No condensation	5	-	95	%RH
Pin soldering temperature	The solder joint is 1.5mm away from the shell, 10s	-	-	+300	°C

On-off level	PWM Mode	-	250	-	KHz
Vibration		10-55Hz,10G,30Min.alongX,YandZ			
Shell material		Aluminum shell			
Minimum time between failures	MIL-HDBK-217F@25°C	-	2X10 ⁵	-	Hrs

Temperature Characteristic Curve



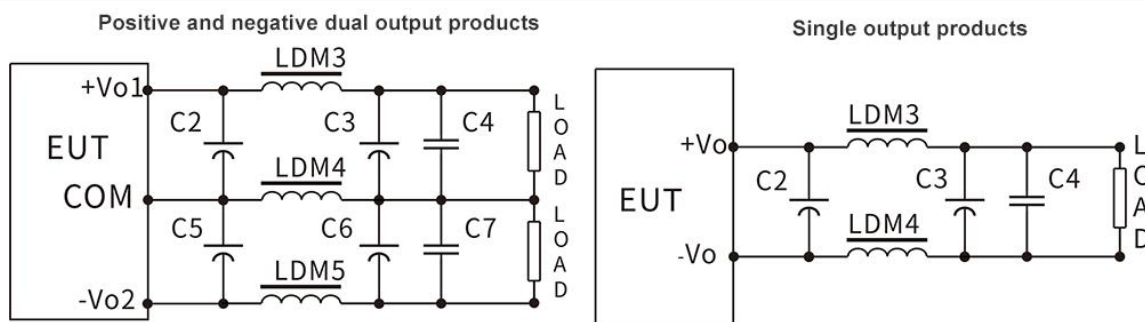
EMC Peripheral Recommended Circuits



Recommended parameters: the following are typical parameters, please adjust according to the actual use of the environment accordingly

Device code	12V input products	24V input products	48V input products	110V input products
FMSE fuses	Access to the corresponding fuses according to customer needs			
MOV varistors	14D330K	14D560K	14D101K	14D201K
LDM1 common mode	10mH	10mH	15mH	30mH
E1, E2 electrolytic capacitors	100μF/50V	100μF/50V	100μF/100V	63μF/200V
C0, C1 ceramic capacitors	1μF/50V	1μF/50V	1μF/100V	0.47μF/250V
LDM2 differential mode iInductors	10μH	10μH	15μH	68μH
CY1 safety Y2 capacitor	1nF/250Vac			

Output Filter Peripheral Recommended Circuit



When the requirements for ripple & noise are general, it is recommended to use only C2 and C5 for the periphery; when the requirements for ripple & noise are strict, the circuit shown above is recommended.

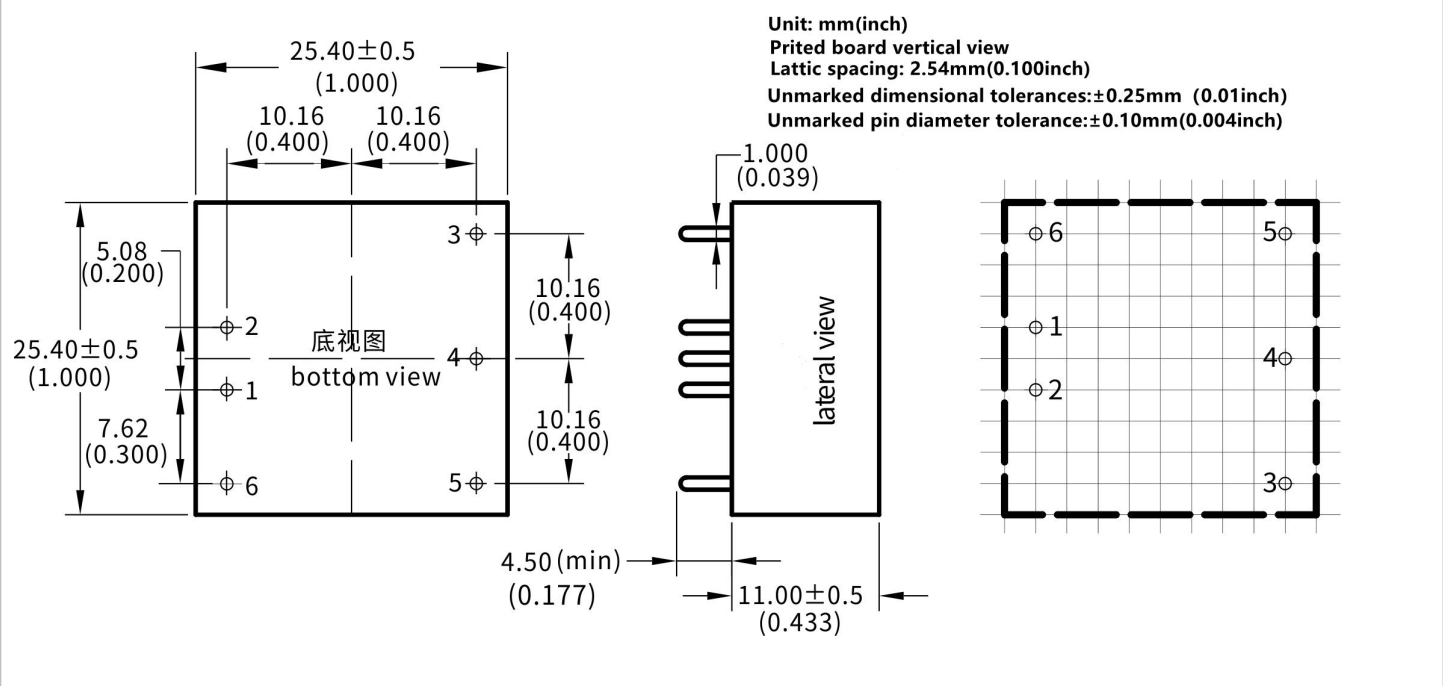
Note:

1. C2, C3, C5, C6 use high-frequency low-resistance electrolytic capacitors, and the total capacity cannot exceed the maximum capacitive load marked in the manual, otherwise the module will not be able to start normally.
2. When the capacitive load is used, the minimum load of 3% must be guaranteed, otherwise the module output will be abnormal.
3. LDM5 is only used for dual output products.

Parameter recommendation:

Accessories code	3.3V output	±5V or 5V output	±9V/12V or 9V/12V output	±15V or 15V output	±24V or 24V output
LDM3 inductance	0.47μH	1μH	2.2μH	2.2μH	4.7μH
LDM4 inductance	0.47μH	1μH	2.2μH	2.2μH	4.7μH
LDM5 inductance	-	1μH	2.2μH	2.2μH	4.7μH
C2, C3 electrolytic capacitor	220μF	220μF	100μF	100μF	68μF
C5, C6 electrolytic capacitor	220μF	220μF	100μF	100μF	68μF
C4, C7 ceramic capacitors	1μF/50V				

Package Size and Pin Function Diagram



Single(S)	1	2	3	4	5	6
	-Vin	+Vin	+Vo	NP	GND	NP
	Input negative	Input positive	Output positive	Not connected	Output ground	Not connected
Doul(D)	-Vin	+Vin	+Vo1	COM	-Vo2	NP
	Input negative	Input positive	output positive 1	Common port	Output negative 2	Not connected

*Note: If the definition of each pin of the power module is inconsistent with the selection manual, the label on the physical label shall prevail.

Package Description

Package code	LxWxH	
A3	25.4x25.4x11.0mm	1.000x1.000x0.433inch

Test Application Reference

Recommended test circuit

1、DC/DC test circuit:

Generally recommended capacitors: C1: 47-100μF; C2、C3: 10-22μF.

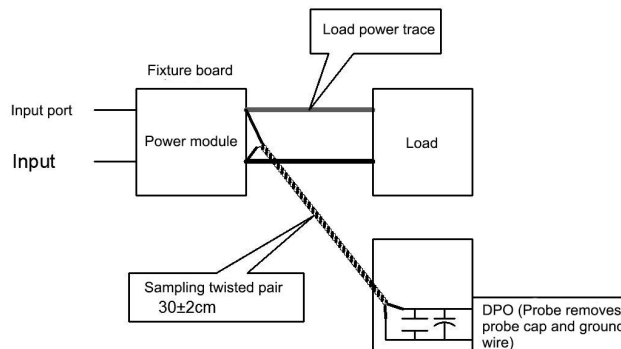
2、Ripple & noise test: (twisted pair method 20MHZ bandwidth)

Testing method:

A. Ripple noise is connected by 12# twisted pair, the bandwidth of the oscilloscope is set to 20MHz, the bandwidth of the probe is 100M, and the 0.1uF polypropylene capacitor and the 47uF high-frequency low-resistance electrolytic capacitor are connected in parallel with the probe end, and the oscilloscope sampling uses the Sample sampling mode.

B. Schematic diagram of output ripple noise test:

Connect the power input terminal to the input power supply, and connect the power output to the electronic load through the fixture board. The test uses a 30cm±2cm sampling line to directly sample from the power output port. The power line selects the wire with the insulation sheath of the corresponding wire diameter according to the magnitude of the output current.



Contact

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